

Space management during dentition development: a case report

*Supervisão do espaço durante o desenvolvimento da dentição:
relato de caso clínico*

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Abstract

Objective – This case report describes a significant follow-up of a patient who had ectopic eruption. A 10-year-old child presenting a lower right second premolar with an eruption deviation was passively corrected. The 11 years follow-up showed the tooth with good root length, closed apex and functionally active. For proper positioning of the permanent tooth, the developmental phases of dentition as well as its eruption sequence, symmetry, and chronology were early observed by the practitioner. This unusual long-term follow-up case showed that space management during dentition development and opportune diagnosis can avoid more complicated orthodontic treatments in some cases.

Key words: Tooth eruption, ectopic; Early diagnosis; Orthodontics, interceptive

Resumo

Objetivo – Este caso clínico descreve um significativo acompanhamento de uma paciente com erupção ectópica. A paciente, com 10 anos de idade, apresentava o segundo pré-molar inferior direito com desvio de erupção, que foi passivamente corrigido. O acompanhamento de 11 anos do caso mostrou o dente com bom comprimento de raiz, ápice fechado e funcionalmente ativo. Para o correto posicionamento do dente permanente, as fases de desenvolvimento da dentição, assim como a sequência de erupção, simetria e cronologia foram observadas desde o início pelo profissional. Este interessante caso com acompanhamento em longo prazo demonstrou que a supervisão de espaço durante desenvolvimento da dentição e o diagnóstico oportunamente podem evitar tratamentos ortodônticos mais complicados em alguns casos.

Palavras-chave: Erupção ectópica do dente; Diagnóstico precoce; Ortodontia interceptora

Introduction

Management of space during dentition development is important for the equilibrium of stomatognathic system. The developmental phases of dentition as well as its eruption sequence, symmetry, and chronology should be known by the practitioner, in addition to managing leeway space for proper positioning of permanent dentition. One of the factors that can cause an imbalance in this process is the ectopic eruption, in which the permanent tooth is deviated from its normal eruption course, resulting in abnormal resorption of the preceding deciduous tooth.

Migration of lower second premolars towards ectopic positions before their eruption may be related to presence of periapical lesions or prolonged retention of deciduous molars¹.

The decision-making regarding the treatment should consider whether enough space exists for eruption of permanent tooth, whether impaction is profound, or whether tooth is horizontally positioned. In such cases, surgical exposure and orthodontic traction are indicated. In favourable position, extraction of retained deciduous second molar can facilitate the eruption of the second premolar, thus preventing it from moving towards incorrect position².

Spontaneous eruption of second premolar located between the roots of first premolar and first permanent molar, with delayed root development, was observed following orthodontic space opening. The root reached its normal length, and functional and aesthetical results were favourable³.

When tooth is associated with dentigerous cysts, marsupialisation is effective in promoting dental eruption. The nature of the cyst is important for successful outcomes; position, angulation, and root maturity of the cyst-involved tooth should be considered in the treatment plan⁴.

The objective of this clinical case report is to describe an unusual long term follow-up of a patient who had her lower right second premolar presenting eruption deviation and was passively corrected.

Case report

A Caucasian girl aged 10 years and 7 months old was treated at the Department of Orthodontics, Dental School, University Paulista, São Paulo-SP, Brazil. She presented with her lower right deciduous second molar (85) in occlusion and without mobility, but the analogous tooth on the left side (75) was in the exfoliation phase. Panoramic radiograph (Figure 1A) confirmed that tooth 85 had few signs of rhizolysis. Periapical radiograph was taken three months after the initial examination and showed a distal deviation in the eruption pathway of the lower right second premolar (45) (Figure 2A).

In this phase, it was decided to remove tooth 85 in order to create an eruption corridor for tooth 45 (Figure 2B) and was installed a space maintainer appliance. After removing this appliance (Figure 2C), tooth erupted into the oral cavity and its root went on growing (Figure 2D) until complete apical closure (Figures 1B, 2E).

The patient, who exhibited Angle Class II skeletal malocclusion, was treated with orthopedic appliances (Bionator, Sander's SII appliance and headgear appliance) and 0.018"-in slot Ricketts' appliance in upper arch only. After this phase, a Hawley retainer was used for further one year.

After following up the patient clinically and radiographically for 11 years and 2 months, the lower right second premolar presents with good root length and closed apex, besides being in occlusion and functionally active (Figures 2F and 3). Its eruption pathway was passively corrected and its integrity preserved.

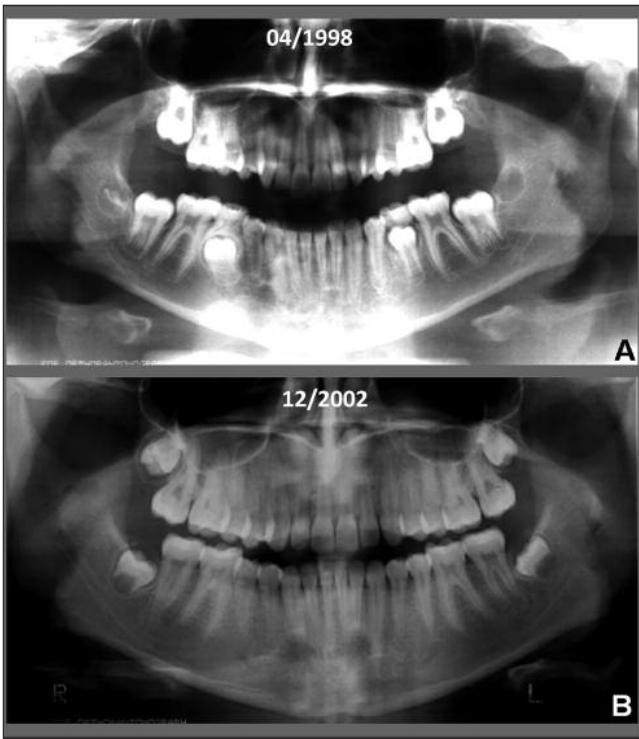


Figure 1A. Radiographic evaluation of the difference in rhizolysis between teeth 75 and 85.

Figure 1B. Follow-up panoramic radiograph showing correct position of tooth 45 and its apical closure



Figure 2A. Periapical radiograph showing distal deviation of the erupting tooth 45

Figure 2B. Deciduous tooth was extracted, thus creating an eruption corridor

Figure 2C. Tooth 45 in a more occlusal position

Figure 2D. Tooth in oral cavity and its root development

Figure 2E. Tooth in occlusion with its root completely developed

Figure 2F. Follow-up after 11 years from the beginning of the study



Figure 3. Intra-oral photographs after 11 years

Discussion

Observing symmetry, managing space available for eruption of permanent teeth, recognizing of individual variations are important for detecting early dental deviation, which increases the likelihood of dental occlusion correction.

Dental eruption, among other factors, is related to root formation that occurs simultaneously to the development of adjacent alveolar process and resorption of deciduous tooth so that the permanent one can erupt². When judiciously indicated, maintenance or recovery of space can be of great value in terms of conservative treatment, often avoiding future invasive interventions such as traction and osseointegrated dental implant.

The patient we have treated exhibited eruption deviation of tooth 45, but no endodontic change was observed in the preceding deciduous tooth. Delayed root development and eruption can cause such a deviation, and arch length deficiency might lead to tooth impaction³. Impaction of lower second premolars is relatively rare and can be a special challenge for clinical dentists and orthodontists². If the problem had been detected earlier, treatment of the premolars might have been easier.

When tooth is associated with dentigerous cysts, marsupialisation is effective in promoting dental eruption. The nature of the cyst is important for successful outcomes; position, angulation, and root maturity of the cyst-involved tooth should be considered in the treatment plan⁴.

In this case, the intervention showed that eruption pathway was passively corrected, thus avoiding invasive treatments such as surgical exposure and orthodontic traction.

Conclusion

Because the eruption of permanent teeth is strongly influenced by deciduous dentition, the best way to prevent problems is to diagnose and intervene as soon as possible, including periodical clinical follow-up and radiographic exams. It is interesting to prove how early and individualized diagnosis can minimize treatment needs and prevents associated complications.

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